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PATENT & TRADEMARK OFFICE

CLAIMS LISTING

1. (CURRENTLY AMENDED) A Computer Aided Design, Computer Aided Manufacturing (CAD-CAM), software program embodied on a computer readable medium, which supports Product Lifecycle Management, said CAD-CAM software program comprising:

current state information for at least one product and its design;
decision and accountability information tracking each product and its design up through its current state;
a Resource Management Subsystem;
a Product Lifecycle Management database;
a Collaboration Subsystem; and,
a Project Management subsystem;

wherein said database and subsystems take inputs from at least one external source, exchange data with at least one human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

2. (CANCELLED)

3. (CURRENTLY AMENDED) ~~A CAD-CAM software program that supports Product Lifecycle Management as in Claim 2, wherein said means for importing data concerning a product from a variety of computer formats further comprise a module for translation from a bill of materials for such product to a design.~~ A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, further comprising:

means for importing data concerning a product from a variety of computer formats comprising a module for translation from a bill of materials for said product to a design; and,
means for recording, as current state information for said product and its design, both the fact of translation and the translation process used, from said bill of materials; and,
means for identifying and recording, as the decision and accountability information tracking said product and its design up through its current state, that individual who instigated said translation and its origin.

4. (CURRENTLY AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, ~~wherein said means for importing data concerning a product from a variety of computer formats further comprise a module for translation from an engineering drawing for such product to a design~~. further comprising:

means for importing data concerning a product from a variety of computer formats comprising a module for translation from an engineering drawing for said product to a design; and,
means for recording, as current state information for said product and its design, both the fact of translation and the translation process used, from said engineering drawing; and,
means for identifying and recording, as the decision and accountability information tracking said product and its design up through its current state, that individual who instigated said translation and its origin.

5. (CURRENTLY AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 2, wherein said means for importing data concerning a product from a variety of computer formats further comprises a module that enables a

human user to select a design already contained within any database accessible to the software program, said module comprising:

means for translating said data into a set of design constraints;
means for using said constraints to identify all candidates for equivalents contained within said database and said Project Management Subsystem;
means for listing said candidates for equivalents;~~ and,~~
incorporating the set of design constraints into the current state information for at least one product and its design;
means for using the decision and accountability information tracking each product and its design up through its current state to enable at least one member of the set of design constraints to be changed;
means for letting the human user select and designate at least one candidate as the replacement; and,
means for tracking a Deviation Authorization for a change in at least one member of the set of design constraints.

6. (CURRENTLY AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, further comprising:

~~means for maintaining design standards;~~
~~means for coordinating design changes;~~
~~means for managing resources; and,~~
~~means for coordinating timing;~~
~~means for document unification, tracking, and control;~~
~~Engineering Change Order Processing; and,~~
~~related manufacturing efforts;~~
means for using the current state information for at least one product and its design, and the decision and accountability information tracking each product and its design up through its current state, to:
    maintain design standards;

coordinate design changes;
manage resources; and,
coordinate timing;

for a design, between projects, across organizational boundaries, or between organizational groupings; and,

means for document unification, tracking, and control, and means for Engineering Change Order Processing amongst related manufacturing efforts for at least one product, that:

maintain design standards;
coordinate design changes;
manage resources; and,
coordinate timing;

through using the current state information for at least one product and its design, and the decision and accountability information tracking each product and its design up through its current state.

7. (CURRENTLY AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, wherein the Resource Management subsystem comprises:

means for translating data between third-party planning software and records, and the CAD-CAM software program's inputs and outputs;

means for incorporating as design constraints and potential elements information concerning third party designs and products;

means for exchanging reports concerning each project and design managed by the CAD-CAM software program with a human user; and,

means for sharing information concerning status for each project and design managed by the CAD-CAM software program amongst human users, said information concerning status specifically including:

current state information for a product and its design;

information reflecting management-imposed and business-related, as opposed to engineering-related, design constraints used for coordinating and managing resources amongst different and distinct projects and designs; and,
decision and accountability information tracking said product and its design up through its current state.

8. (CURRENTLY AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, wherein the Product Lifecycle Management database further comprises:

for each design, and each product, its current state information;
all information reflecting management-imposed and business-related, as opposed to engineering-related, design constraints used for coordinating and managing resources amongst different and distinct projects and designs;
all decision and accountability information tracking each product and each design up through its current state;
all records used by the CAD-CAM software program to control and coordinate all activities between the database and subsystems; and,
all records used by the CAD-CAM software program to record, track, update, and report on the full lifecycle for each project and product handled by the CAD-CAM software program.

9. (CANCELLED)

10. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, wherein the Collaboration subsystem further comprises:

means for:

collecting as inputs records from differing organizational groups involved in a design process being managed by the CAD-CAM software program; and,

including in such records current state information for and decision and accountability information tracking at least one product and its design up through its current state; and,

means for producing from said records status data as outputs, thereby sharing such status data with differing organizational groups involved in a design process being managed by the CAD-CAM software program.

11. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 10, wherein the means for producing from said records status data as outputs, thereby sharing such status data with differing organizational groups involved in a design process being managed by the CAD-CAM software program, comprises automatic messaging of such outputs to at least one recipient designated by a human user of the CAD-CAM software program.

12. (CURRENTLY AMENDED) A CAD-CAM software program ~~that supports Product Lifecycle Management as in Claim 1,~~ embodied on a computer readable medium, which supports Product Lifecycle Management, said CAD-CAM software program comprising:

current state information for at least one product and its design;

decision and accountability information tracking each product and its design up through its current state;

a Resource Management Subsystem;

a Product Lifecycle Management database;

a Collaboration Subsystem; and,

a Project Management subsystem further comprising:

~~wherein the Project Management subsystem further comprises:~~

a Project database;

a Component database;

a Search and Cross Reference engine, operating in coordination with the Component database;

a Component Data Management subsystem;

an Auto Engineering Change Order subsystem;

a Bill of Materials generator;

a Design Subsystem, operating in coordination with the Component database, Search and Cross-Reference engine, Component Data Management subsystem, Auto Engineering Change Order subsystem, and Bill of Materials generator; and,

a Manufacturing subsystem, which includes a Purchasing subsystem;

wherein for each distinct project initiated by a human user said databases, engine, subsystems, generator, and Design Subsystem take inputs from at least one external source, exchange data with the human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the CAD-CAM software program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

13. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 12, wherein the Project database is a relational database which can track and make use of the relationships between and amongst the attributes of its data.

14. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 13, wherein the Project database tracks for each distinct project the design state, supporting materials state, current interaction, human user, and progress on any associated report, validation, verification, and documentation requirement, from inception through completion of that distinct project.

15. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 13, wherein the Component database is a relational database which can track and make use of the relationships between and amongst the attributes of its data.

16. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 15, wherein the Component database further comprises at least one library of components for a particular class of hardware wherein each component in said library of components is both currently available on the open market and has its attributes as they are specified by that component's manufacturer included in the database.

17. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 12, wherein the Search and Cross-Reference Engine further comprises:

means for using a constraint-based approach for rapid classification and identification of identical, similar, and like components;

means for reporting for display to the human user both:

(a) all components matching the constraints provided to the Search and Cross-Reference Engine; and,

(b) for each such component, the particulars contained in the databases of such component; and,

means for using a comparative description for each attribute and constraint rather than a component's manufacturer's description, to provide a unified standard of comparison across different manufacturers.

18. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 12, wherein the Component Data Management subsystem further comprises:

means for collecting, collating, and managing the details for each and every component comprising a part of each design, whether said part be a single component, a sub-assembly of sub-components, or a sub-component;

means for providing the current representation of the design to the human user in accordance with said human user's expressed desire, further comprising:

means for providing a graphical representation;

means for providing a textual representation;

means for providing a list representation;

means for providing a dependency-tree representation; and,

means for providing any combination of the above,

depending on the human user's desire for more or less detail concerning the current state of the design involving that component.

19. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 12, wherein the Auto Engineering Change Order subsystem further comprises:

for each project and design:

means for managing the documentation;

means for tracking, for accountability purposes, the human sources for design changes as they are made; and,

means for transferring a design and its associated documentation between a design group and a manufacturing group.

20. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 19, wherein the Auto Engineering Change Order subsystem further comprises:

for each proposed change to an existing design:

means for associating with such request an Engineering Change Request;

means for translating each Engineering Change Request into design goals and constraints;

means for assigning to each Engineering Change Request a unique identifier; and,

means for associating with each Engineering Change Request an Engineering Change Order, which tracks the request as it moves from initial instantiation to satisfaction through a new and completed design of the translated design goals and constraints; and,

for temporary, interim, or automatic changes to a design, means for associating to that design a unique and accountable Deviation Authorization which can subsequently be reviewed by a human user.

21. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 12, wherein the Bill of Materials generator further comprises:

means for resolving a design into a complete and correct list of its components;

means for associating with each differentiable component on such list its source, whether it is a unitary component in the design or an subassembly, whether it is singular and if not the number of identical components on the list, the source manufacturer's product number, the user's product number;

means for repeatedly invoking, through iteration or recursion, the above means for resolving a design into a complete and correct list of its components, for each component which is a subassembly;

and,

means for summing up, after all repeated invocations are completed, all complete and correct lists of components into a single, unified, non-duplicative, complete, and correct Bill of Materials for the design.

22. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, wherein the Design Subsystem further comprises:

a Design Rules Check engine;

an Assembly Drawing generator;

a Verification module;

a Simulation module; and,

a Testing subsystem;

wherein said generator, modules, and subsystem take inputs, exchange data, and produce outputs in accordance with the decisions entered by the human user and associated with a design being processed by said Design subsystem.

23. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Design Subsystem further comprises:

means for taking input from any of a human user, another CAD, CAM, or CAD-CAM program, or Bill of Materials; and,

means for translating said input into design goals and constraints into an optimized standard format used by the CAD-CAM software program.

24. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Design Rules Check engine further comprises:

means for comparing attributes against constraints;

means for testing each design objective and constraint against both a set of design rules contained within any database accessed by the Design Subsystem, and all components contained in the design currently being processed by the CAD-CAM program; and,

means for reporting the results of such testing back to the human user.

25. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Design Rules Check engine further comprises customization elements enabling a human user to order and constrain the outputs in accordance with the human user's preferences.

26. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Assembly Drawing generator further comprises:

means for drawing each component of a design;

means for drawing each connection established between each component of the design; and,

means for drawing each connection necessary, yet not established, between any component of the design and an as-yet non-detailed element.

27. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Verification module further comprises:

means for identifying potential sneak circuits in a design;

means for reporting all said potential sneak circuits;
means for classifying all said potential sneak circuits into the closest associated type; and,
means for listing, for each potential sneak circuit, the topology and components relating thereto.

28. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 27, wherein the Verification module further comprises:

means for taking results from the Simulation module;
means for analyzing consequences for the entire design from the results from the Simulation module;
means for estimating the damage to the completed product from such consequences; and,
means for displaying to the user (a) those components of the design which will not work properly, (b) the results of analyzing the consequences for the entire design from the results, and, (c) the damage estimates, for redesign and costing evaluation.

29. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Simulation module further comprises:

means for tracking all signals sent across the design's components;
means for comparing all inputs into and outputs from said design against the constraints of permissible, anticipated, and acceptable inputs and outputs; and,
means for identifying problems and suggesting corrections thereto, including (a) noting duplication of supposedly unique identifiers and attaching to each duplicate an automatically generated alteration making it unique, (b) separating and reconnecting misconnected connections, (c) providing defaults for uncompleted connections, (d) identifying signal incompatibilities, and (e) providing a complete list of all failures to match constraints and all signal incompatibilities, organized by components and connections.

30. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 22, wherein the Testing subsystem further comprises:

means for connecting a product fabricated in accordance with the design to the computer running the CAD-CAM PLM software;

means for connecting at least one external testing device to the computer running the CAD-CAM PLM software;

means for comparing the performance of the connected product, in response to the external testing device running a specified test process, against the specifications, constraints, and design requirements in the program's databases; and,

means for reporting the results of such comparison for each specified test process, including specifically for each tested specification, constraint, and design requirement the actual measurement obtained through the external testing device.

31. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 30, wherein the Testing subsystem further comprises:

means for translating a design into a connected series of states with associated constraints based on real-world, physical limitations of the materials specified in the design, then

means for testing the actual behavior of the product in operation under different conditions specified by inputs identifying a particular state and its associated constraints and at least one additional test condition;

means for generating as a test condition, for each input and test condition, the associated signals through the external testing device, and sending the same through the connected product;

means for evaluating whether any particular state is rendered unreachable and whether any associated constraint is violated by said additional test condition; and,

means for reporting that evaluation.

32. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, wherein the Purchasing subsystem further comprises:

an access path for a non-engineer human user;

means for the non-engineer human user to access and use the Component Database and coordinated Search and Cross-Reference Engine to select, allocate, and buy all of a product's required components;

a second access path for a design engineer human user to submit a purchasing request directly to a purchasing agent; and,

means for automatic notification to a human user when a component arrives, said notification being identified by the product with which said component is associated.

33. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim `32, wherein the Manufacturing Subsystem further comprises:

means for notifying a human user associated with documentation associated with a component when said documentation changes of such change; and,

means for updating the databases to incorporate such documentation changes.

34. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 33, wherein the Manufacturing Subsystem further comprises;

means for taking inputs from and sending outputs to an external inventory management, financial cash-flow, or payment tracking program; and,

means for automatically generating, tracking, and reporting e-Commerce purchasing orders for components for a design, in accordance with the authorization and other constraints on the human user and such programs.

35. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, wherein the Manufacturing Subsystem further comprises:

means for a human user to identify a particular component which must be changed in response to a real-world manufacturing necessity;

means for invoking the Design Subsystem to:

invoke the Component database and Search and Cross-Reference engine to find potential alternative replacements;

display all potential alternative replacements to a human user;

for each potential alternative replacement selected by a human user, verify, simulate, and test the design where that potential alternative replacement is used as the replacement for the particular component which must be changed; and,

report the results of such replacement to the human user; and

means for generating Deviation Authorization for the replacement selected;

means for generating all associated documentation for the new design;

means for displaying all parent assemblies using that particular component which is to be replaced, from which the user would select those to be changed; and, generating, for each design which is changed, the new Bill of Materials, new Assembly drawings, and new associated documentation for the changed design, in all of which the data for the particular component being replaced, would be replaced by the replacement part's data.

36. (ORIGINAL) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 1, further comprising at least one library of attributes, constraints, and rules associated with a given field of manufacturing.

37. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 1, further comprising at least one library of attributes, constraints, and rules associated with a given field of engineering.

38. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 35,further comprising at least one template for a previously-created design for an HES.

39. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 36, further comprising a user-supplied proprietary design database.

40. (AMENDED) A Computer Aided Design, Computer Aided Manufacturing (CAD-CAM), software program embodied on a computer readable medium, which supports Product Lifecycle Management, comprising:

a Resource Management Subsystem;
a Product Lifecycle Management database;
a Collaboration Subsystem; and,
a Project Management subsystem;

wherein said database and subsystems contain data, rules, and processes specific to the electronics industry, and take inputs from at least one external source, exchange data with at least one human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

41. (AMENDED) A Computer Aided Design, Computer Aided Manufacturing (CAD-CAM), software program embodied on a computer readable medium, which supports Product Lifecycle Management, comprising:

a Resource Management Subsystem;
a Product Lifecycle Management database;

a Collaboration Subsystem; and,

a Project Management subsystem;

wherein said database and subsystems contain data, rules, and processes specific to the telecommunications industry, and take inputs from at least one external source, exchange data with at least one human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

42. (AMENDED) A Computer Aided Design, Computer Aided Manufacturing (CAD-CAM), software program embodied on a computer readable medium, which supports Product Lifecycle Management, comprising:

a Resource Management Subsystem;

a Product Lifecycle Management database;

a Collaboration Subsystem; and,

a Project Management subsystem;

wherein said database and subsystems contain data, rules, and processes specific to the computer industry, and take inputs from at least one external source, exchange data with at least one human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

43. (AMENDED) A Computer Aided Design, Computer Aided Manufacturing (CAD-CAM), software program embodied on a computer readable medium, which supports Product Lifecycle Management, comprising:

a Resource Management Subsystem;

a Product Lifecycle Management database;

a Collaboration Subsystem; and,

a Project Management subsystem;

wherein said database and subsystems contain data, rules, and processes specific to medical devices, and take inputs from at least one external source, exchange data with at least one human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

44. (AMENDED) A Computer Aided Design, Computer Aided Manufacturing (CAD-CAM), software program embodied on a computer readable medium, which supports Product Lifecycle Management, comprising:

a Resource Management Subsystem;

a Product Lifecycle Management database;

a Collaboration Subsystem; and,

a Project Management subsystem;

wherein said database and subsystems contain data, rules, and processes specific to the plumbing industry, and take inputs from at least one external source, exchange data with at least one human user and amongst each other, and in accordance with the decisions and constraints entered by the human user and contained within the program, produce as an output at least one design of at least one product and supporting documentation associated with said design, both design and documentation being as complete as said decisions and constraints allow.

45. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 1, further comprising at least one library of HES designs.

46. (AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 45, further comprising a module for classifying, incorporating, and subsequently using a new set of defaults based on the decisions and constraints entered by al least one human user~~human user's corrections~~.

47. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 45, further comprising a module for classifying, incorporating, and subsequently using a new set of defaults based on the most recent additions to the designs in the databases

48. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising:

means for identifying uncompleted components;
means for identifying uncompleted connections; and,
means for alerting a human user to such.

49. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising a module enabling the human user to use the Search and Cross-Reference engine to substitute equivalent components from any of the program's databases for any component identified as no longer being available within the design's constraints.

50. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising a module for identifying and disabling any design in any of the program's databases containing a component which is no longer available and for which no acceptable replacement can be identified.

51. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising an Automatic Physical and Logical Interconnect (APLI) module for joining any tuple of designs into a new combination.

52. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 51, wherein the APLI module further comprises an element that tracks signals by both logical and physical specifications through the design interconnections.

53. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising:

means for managing design generation information; and,

means for managing support for user generation, dissemination, emendation, tracking, and comparison of documents relevant to the users Engineering, document control, manufacturing, purchasing, procurement, inventory, and other management concerns.

54. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising a module for supporting translation from a partial description of a product to a complete design, for a product which has a current physical instantiation but not an informational instantiation.

55. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising:

means for randomly selecting a particular component and inducing a change therein;

means for assessing the effects of such change on the remainder of the design;

means for adapting the remainder of the design to such change; and,
means for comparing relative advantages and disadvantages between the previous and modified design.

56. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 55, further comprising at least one rule for directing the selection of a particular component rather than settling for a random choice.

57. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising a module enforcing revision control for each design, and subsequent changes, managed by the software program.

58. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising:

means for connecting to the Internet;
means for searching across the Internet for all potential replacements for any component contained in any of the software program's databases; and,
means for reporting the possibility of such replacement to the human user.

59. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising an extension to the Search and Cross-Reference engine that enables any search to use multiple attributes simultaneously.

60. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 59, further comprising an extension enabling the human user to specify the relative order in which the attributes for potential replacements should

determine desirability of the otherwise-equivalent potential replacements for a component.

61. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising incorporated heuristic algorithms for sorting the potential components for a design in response to the importance given to the attributes by a human user.

62. (ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 12, further comprising a module for taking a system interconnection diagram for a HES, and working backwards through the interconnections and component matchings, to generate a design for a product satisfying that system interconnection diagram.

63. (CANCELLED)

64. (CANCELLED)

65. (CURRENTLY AMENDED) A CAD-CAM software program that supports Product Lifecycle Management as in Claim 36, further comprising:

an Interactive Help Module, comprising:

means for providing an overview on the software tool;

a general engineering library with incorporated references for the given field;

a glossary of terms;

a technical overview for each field of engineering contained within the database and subsystems; and,

means for the human user to access all of the above.

66.(CURRENTLY AMENDED) A CAD-CAM software program that support Product Lifecycle Management as in Claim 36, further comprising a tutorial module incorporating information in the substantive field of the product being designed, manufactured, and managed, comprising:

training material of the substantive field;

a set of design challenges for the substantive field;

for each design challenge, a previously-worked-out solution set of satisfactory designs; and,

instruction for relative evaluation of the members of the solution set against all constraints and decisions that produced each member of the solution set.

67.(ORIGINAL) A CAD-CAM software program that support Product Lifecycle Management as in Claim 1, further comprising a user interface comprising:

(A) a task selection panel, indicating the set of task steps that a user should select from at the program's current state;

(B) a task completion record, indicating the last completed state of the program;

(C) means for hiding additional optional task steps that are not yet available at the current state of the program;

(D) means for revealing additional optional task steps that have become available at the current state of the program;

(E) means for functionally grouping potential components that may be used at the current state of the program, including:

(i) means for ordering a particular grouping, wherein said means may use either required or secondary and non-required characteristics of said potential components, such means possibly including any of the non-exhaustive list of possible characteristics:

(a) the component's cost;

(b) the component's manufacturer;

(c) the nationality of the component's manufacturer;

(d) the component's color; or,

(e) the material(s) of which the component is made;

(ii) means for each user to configure said grouping; and,

(iii) means for alternative displays of said grouping, including both as a textual list and as a graphical display;

(F) means for functionally grouping potential component that may be used at the current state of the program that operate even when there exist incomplete specifications for at least one component contained in such group;

(i) wherein said component or components for which incomplete specifications exist are distinguishably denoted; or,

(ii) wherein said component or components for which incomplete specifications of secondary, non-required characteristics exist are distinguishably denoted with indications of the missing but presumed non-essential information;

(G) the capacity to display distinct, alternative, representations, both of task steps and of potential component s;

(i) including in said capacity the further capacity to simultaneously display more than one distinct, alternative representation;

(ii) including in said capacity as potential alternatives at least the options of both a graphical display and a text-based display;

(iii) including in said capacity as potential alternatives at least two distinct graphical displays of the identical information; and,

(iv) including in said capacity the ability to display both the information and the source of said information;

(H) means for the user to modify the information base on which the program operates based on the user's knowledge, potentially including as part of said means:

- (i) the ability to provide additional knowledge;
- (ii) the ability to change knowledge already present;
- (iii) the ability to delete knowledge already present;

(iv) the ability to provide, in addition to any addition, modification, or deletion, the source verifying said addition, modification, or deletion;

- (v) the ability to provide a source-trace for any addition, modification, or deletion, including any of the following:
  - (a) the person making the same;
  - (b) the time the same was made;
  - (c) the prior information replaced, if any;
  - (d) the source verifying said prior information, if any; and,
  - (e) the source-trace for said prior information, if any;

(I) for any modification of the information provided, means to translate from the format in which said modification is presented to the program to all representations thereof usable within said program, including:

- (a) text - to - graphical translation; and,
- (b) graphical - to - text translation;

(J) as an extension to the preferred embodiment, means for translating to and from any pre-specified integrative computer program format, such as the CAD-CAM design programs for the various assemblies whose connectors are the subject of this invention; and,

(K) as a further extension to the preferred embodiment, means for translating to and from any human language the supporting documentation, including specifically the detailed engineering specifications, design rules, or design considerations, created, accessed, located, changed, or otherwise accessed by this program.

Claims 68-72: (WITHDRAWN).